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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,256	12/19/2000	Alan R. Reinberg	MCRO:106-2/FLE	5857

7590 06/03/2003  
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EXAMINER

TRAN, THIEN F

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 06/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	09/740,256		REINBERG ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Thien Tran		2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 March 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 32-91 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 32-36, 38, 39, 41-51, 53, 54, 56-66, 68, 69, 71-81, 83, 84 and 86-91 is/are rejected.
- 7) ☒ Claim(s) 37, 40, 52, 55, 67, 70, 82 and 85 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed, a device not method for fabricating the device.

### ***Claim Objections***

Claim 62 is objected to because of the following informalities: lines 4-5, "spaced apart by a portion of a substrate" should be --spaced apart by an insulating layer--. Fig. 15 shows the first conductive line 24 and the second conductive line 22 being spaced apart by an insulating layer 64, not by a portion of a substrate 12. Appropriate correction is required.

Claim 77 is objected to because of the following informalities: lines 4-5, "spaced apart by a portion of a substrate" should be --spaced apart by an insulating layer--. Fig. 15 shows the first conductive line 24 and the second conductive line 22 being spaced apart by an insulating layer 64, not by a portion of a substrate 12. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

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only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 32-33, 38-39, 41-48, 53-54, 56-63, 68-69, 71-78, 83-84 and 86-91 are rejected under 35 U.S.C. 102(e) as being anticipated by Klersy et al. (USPN 5,536,947).

Klersy et al. discloses the claimed memory cell (Figs. 1 and 2) comprising an area defined by an intersection of a word line 42 and a bit line 12; an access device (32, 34); a memory element operatively coupled to the access device, the memory element comprising dielectric material 46 having a pore therein; a first electrode 48 disposed within the pore; a memory material 36 disposed over the first electrode; and a second electrode (38, 40) disposed over to the memory material; and wherein the access device and the memory element are disposed wholly in the area. The current photolithographic limit is about 0.2  $\mu\text{m}$ . Klersy et al. discloses a memory cell wherein the pore diameter is as low as 0.01  $\mu\text{m}$  (col. 17, lines 20-23). Therefore, the pore is smaller than a photolithographic limit.

Regarding claims 33, 48, 63 and 78, the access device comprises a diode 26 (Fig. 3).

Regarding claims 38, 53, 68 and 83, the second electrode comprises a plurality of layers (38, 40).

Regarding claims 39, 54, 69 and 84, the second electrode comprises a plurality of materials.

Regarding claims 41-46, 56-61, 71-76 and 86-91, the memory material 36 comprises structure changing material of a chalcogenide material which inherently changes between different states of crystallinity in response to electrical stimulus,

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wherein each of the different states of crystallinity corresponds to a given resistance level. The chalcogenide material comprises a programmable resistive element that changes between different resistance levels in response to electrical stimulus.

Regarding claims 62 and 77, Klersy et al. further discloses a first conductive line 12 extending in a first direction; a second conductive line 42 extending in a second direction different than the first direction, the first conductive line and the second conductive line being spaced apart by a portion of a substrate, the second conductive line intersecting the first conductive line in an overlapping manner to form an area of intersection in the portion of the substrate, the access device (diode) wholly disposed in the area of intersection, the access device (diode) being operatively coupled to the first conductive line, the memory element wholly disposed in the area of intersection.

Claims 34, 49, 64 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klersy et al. (USPN 5,536,947) as applied to claims 32, 47, 62 and 77 above, and further in view of Wang et al. (USPN 4,616,404).

Klersy et al. as described above does not disclose the diode 26 comprising a layer of N doped polysilicon disposed adjacent a layer of P doped polysilicon. It is old and well known in the art that a diode is routinely formed of a layer of N doped polysilicon and a layer of P doped polysilicon as shown for example by Wang et al. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to form the diode 26 of Klersy et al. comprising a layer of N doped polysilicon and a layer of P doped polysilicon to form a polysilicon diode with low reverse current leakage and low series resistance permitting high current flow.

Claims 35-36, 50-51, 65-66 and 80-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klersy et al. (USPN 5,536,947) as applied to claims 32, 47 and 62 above, and further in view of Ovshinsky et al. (USPN 5,414,271).

Klersy et al. as described above does not disclose the first electrode 48 comprising a plurality of layers and a plurality of materials. Ovshinsky et al. discloses the first electrode comprising two layers (32 and 34) of different materials (carbon and molybdenum). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to form the first electrode 48 of Klersy comprising two layers of the materials as taught by Ovshinsky et al. in order to form excellent electrical contacts with the memory material 36.

#### ***Allowable Subject Matter***

Claims 37, 40, 52, 55, 67, 70, 82 and 85 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the primary reason for the allowance of the claims is the inclusion of the limitations "the first electrode comprises a layer of carbon; and a layer of titanium nitride disposed adjacent the layer of carbon" in claims 37, 52, 67 and 82; and "the second electrode comprises a layer of carbon; and a layer of titanium nitride disposed adjacent the layer of carbon" in claims 40, 55, 70 and 85 which are not found in the prior art references.

#### ***Conclusion***

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thien Tran whose telephone number is (703) 308-4108. The examiner can normally be reached on 8:30AM - 5:00PM Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

tt  
May 29, 2003



Thien Tran  
Patent Examiner  
Technology Center 2800